



Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Mulberry Creek

Waterbody Segment at a Glance:

County:	Bates
Nearby Cities:	Amsterdam, Amoret
Length of impairment:	None
Pollutant:	None
Source:	N/A

Note: This stream segment was deleted from the 2002 303(d) list because it is now meeting the sulfate plus chloride standard.



TMDL Priority Ranking: N/A

Description of the Problem

Beneficial uses of Mulberry Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

Use that is impaired

- None

Standards that apply

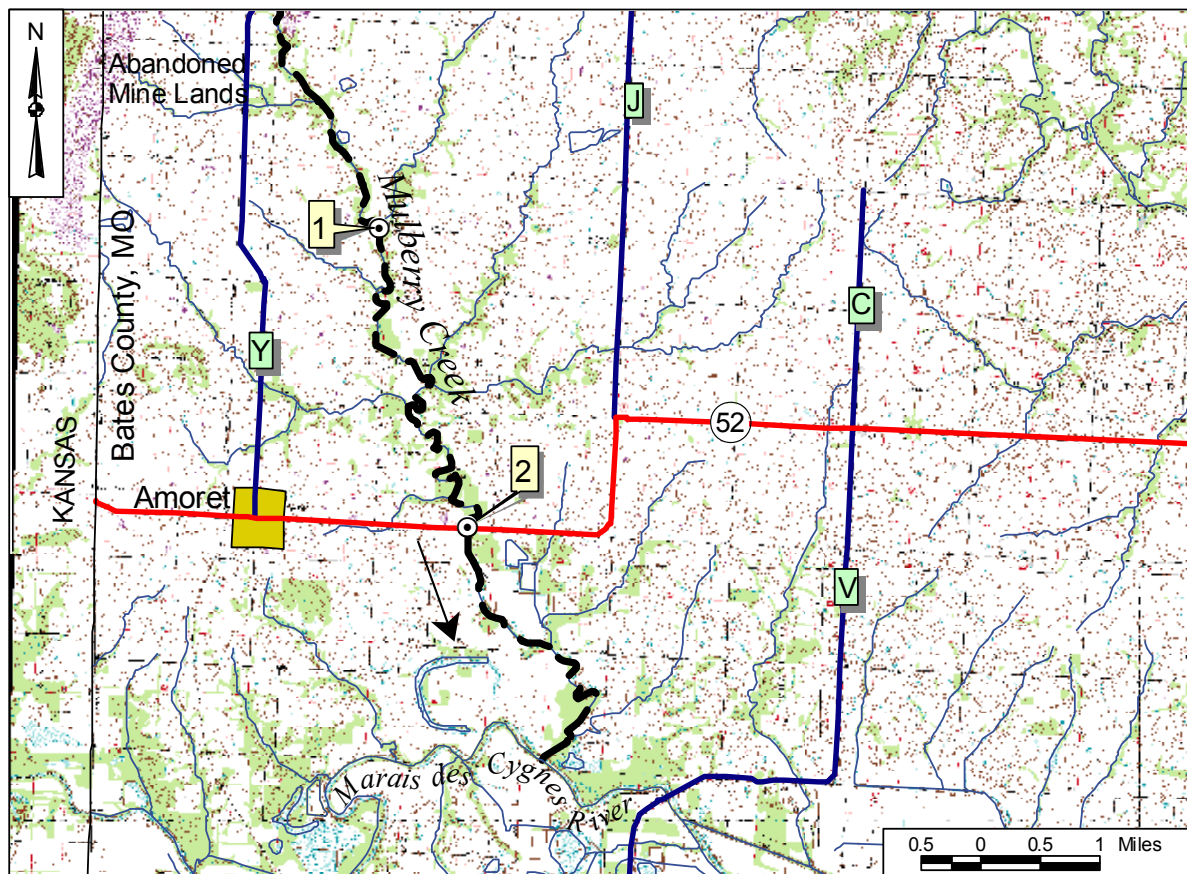
- Sulfate and chloride are linked together in Missouri's Water Quality Standards, 10 CSR20-7.031 (4)(L)1. There it states that the concentration of chloride plus sulfate for streams with a 7Q10 low flow less than 1 cfs shall not exceed 1000 milligrams per liter (mg/L) for protection of aquatic life.

Background information and Water Quality Data

Sulfide minerals, commonly found in coal and the surrounding rock, oxidize when exposed to the air and are subsequently dissolved by groundwater. In many past coal mining areas, this weathering process results in large amounts of sulfate dissolved in groundwater and in surface waters draining these mined lands. Freshwater aquatic life cannot tolerate large amounts of dissolved substances in water. The Missouri water quality standard for dissolved substances is 1000 mg/L of sulfate plus chloride. Levels of chloride in Missouri streams is typically much less than 100 mg/L, so that most dissolved substances problems are related to high levels of sulfate.

Mulberry Creek was originally placed on the 303(d) list based on conductivity measurements made in the early 1990s, which are closely correlated with sulfate and chloride levels in the water. Nine sets of observations of sulfate and chloride levels have been made at two locations in Mulberry Creek during the last two years. The samples show an average sulfate plus chloride concentration of 275 and 283 mg/L at these two sampling sites, well under the 1000 mg/L water quality standard. Mulberry Creek was deleted from the 2002 303(d) list.

Mulberry Creek Abandoned Mine Lands in Bates County, Missouri, Showing Sampling Sites



----- Impaired Section → Direction of Flow

Sample Site Index

- 1 – Mulberry Creek 0.1 mile below abandoned mine land
- 2 – Mulberry Creek at Highway 52

Sulfate and Chloride data for Mulberry Creek

Site Name	Year	Month	Day	Sulfate (mg/L)	Chloride (mg/L)
Mulberry Creek at 52	1998	9	3	428	
Mulberry Creek at 52	1999	6	3	209	8
Mulberry Creek at 52	1999	8	11	302	10
Mulberry Creek at 52	2000	3	15	239	11
Mulberry Creek at 52	2000	5	31	423	15
Mulberry Creek at 52	2000	9	19	295	12
Mulberry Creek at 52	2001	6	12	139	4.99
Mulberry Creek at 52	2001	7	24	282	11
Mulberry Creek at 52	2001	9	5	286	13
Mulberry Creek at 52	2001	10	3	279	11
Mulberry Creek at 52	2001	11	29	414	14
Mulberry Creek at 52	2002	1	9	514	19
Mulberry Creek at 52	2002	3	13	281	26
Mulberry Creek at 52	2002	6	5	179	9.16
Mulberry Creek at 52	2002	6	19	249	11
Mulberry Creek at 52	2003	5	14	521	19
Mulberry Creek at 52	2003	5	29	551	16
Mulberry Creek at 52	2003	6	11	501	17
Mean				338	13
Mulberry Creek 0.1 mile below AML	1998	6	3	172	8
Mulberry Creek 0.1 mile below AML	1998	9	3	395	
Mulberry Creek 0.1 mile below AML	2000	3	15	398	11
Mulberry Creek 0.1 mile below AML	2000	5	31	408	15
Mulberry Creek 0.1 mile below AML	2000	9	19	219	13
Mulberry Creek 0.1 mile below AML	2001	6	12	137	11
Mulberry Creek 0.1 mile below AML	2001	7	24	227	10
Mulberry Creek 0.1 mile below AML	2001	9	5	247	13
Mulberry Creek 0.1 mile below AML	2001	10	3	244	10
Mulberry Creek 0.1 mile below AML	2001	11	29	318	12
Mulberry Creek 0.1 mile below AML	2002	1	9	441	16
Mulberry Creek 0.1 mile below AML	2002	3	13	456	15
Mulberry Creek 0.1 mile below AML	2002	6	5	157	8.32
Mulberry Creek 0.1 mile below AML	2002	6	19	205	10
Mulberry Creek 0.1 mile below AML	2003	5	14	573	15
Mulberry Creek 0.1 mile below AML	2003	5	29	540	17
Mulberry Creek 0.1 mile below AML	2003	6	11	536	19
Mean				334	13

Source: Missouri Department of Natural Resources

For more information call or write:

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